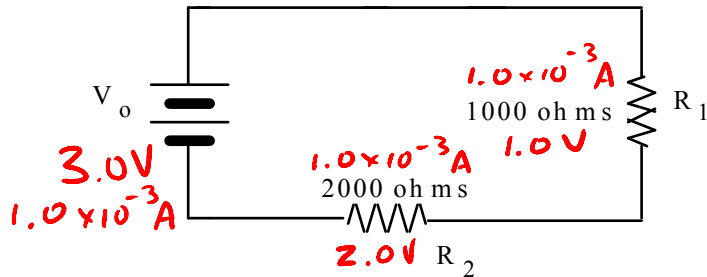


Example #7: Consider the following circuit diagram showing two resistors attached in series to a battery of two 1.5 V cells. Determine all unknown voltages, currents and resistances for each apparatus in the circuit.



V_0 = p.d. of 2-1.5 cells in series

Since cells connected in series have their voltages added together, the total voltage,

$$\begin{aligned} V_0 &= 2 \times 1.5\text{ V} \\ &= 3.0\text{ V} \end{aligned}$$

$$\rightarrow \text{in series, } R_0 = 1000 + 2000 = 3000\ \Omega$$

$$\rightarrow I_0 = \frac{V_0}{R_0} = \frac{3}{3000} = 1.0 \times 10^{-3}\text{ A}$$

\rightarrow in series, I is constant, so

$$I_1 = I_2 = 1.0 \times 10^{-3}\text{ A}$$

Finally,

$$\begin{aligned} V_1 &= I_1 R_1 = .001 (1000) \\ &= 1.0\text{ A} \end{aligned}$$

$$\begin{aligned} V_2 &= I_2 R_2 = .001 (2000) \\ &= 2.0\text{ A} \end{aligned}$$

